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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,497	07/21/2003	Joseph T. Lindgren	M4065.0667/P667	4997
24998	7590	02/07/2005	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			NOVACEK, CHRISTY L	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	

2822

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/622,497

Applicant(s)

LINDGREN, JOSEPH T.

Examiner

Christy L. Novacek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29-34 and 36 is/are allowed.
- 6) ☒ Claim(s) 1-9, 15, 22-28 and 35 is/are rejected.
- 7) ☒ Claim(s) 10-14 and 16-21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/20/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the communication filed July 21, 2003.

Claim Objections

Claim 3 is objected to because of the following informalities: the word “point” should be added after the word “probe” (see corresponding language of claim 15). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 6, 9, 27, 28 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5, 6, 9 and 35 recite the limitation "said conductive connection". There is insufficient antecedent basis for this limitation in the claim.

Claim 27 recites the limitation of “wherein the platable features are electroless-plated features.” This limitation is confusing as written because it is not clear if the term “platable feature” is referring to the feature as it exists before or after plating. The language of claim 27 appears to be calling the feature both “platable” and “plated” at the same time.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 5, 7, 9, 22, 23 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Drewery (US 6,774,039).

Regarding claim 1, Drewery discloses providing on a wafer (200) a die (202) with a contact (400) having a first surface area, providing a supplemental plating structure (900) on the wafer such that the supplemental plating structure has a surface area larger than the surface area of the contact, conductively connecting the supplemental plating structure to the contact, and plating the supplemental plating structure and contact (Fig. 10-12; col. 6, ln. 14 – col. 7, ln. 12; col. 8, ln. 6-24).

Regarding claim 4, Drewery discloses that the supplemental plating structure is located in a street area of the wafer (area between dice) (col. 5, ln. 37-43).

Regarding claim 5, Drewery discloses forming a conductive connection (1106) that is located at least in part in a street area of the wafer (Fig. 11).

Regarding claim 7, Drewery discloses that the supplemental plating structure is located on the wafer outside of an area where dice are formed (col. 5, ln. 37-43).

Regarding claim 9, Drewery discloses that the conductive connection is located at least partly over the die (Fig. 11).

Regarding claim 22, Drewery discloses a plurality of dice (202), each of which has at least one platable feature (400), and at least one second platable feature (900) conductively

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connected to the first platable feature, such that the second platable feature has a larger surface area than the first platable feature (Fig. 10-12; col. 6, ln. 14 – col. 7, ln. 12; col. 8, ln. 6-24).

Regarding claim 23, Drewery discloses that the second platable feature assists in plating the first platable feature (col. 7, ln. 2-5).

Regarding claim 25, Drewery discloses that the second platable feature is connected to the plurality of dice (Fig. 2A-2B; col. 5, ln. 62 – col. 6, ln. 13).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6, 8, 9, 15, 22-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagao et al. (US 6,764,879) in view of Drewery (US 6,774,039).

Regarding claims 1 and 15, Nagao discloses providing on a wafer (15) a die with a first contact (18) having a first surface area, a second contact structure (19) on the wafer such that the second contact structure has a surface area larger than the surface area of the first contact, conductively connecting the second contact structure to the first contact, and plating the first contact (col. 6, ln. 8-37; col. 11, ln. 11-37). Nagao does not disclose using the second contact structure as a supplemental plating structure. Like Nagao, Drewery discloses a process of plating features onto the surface of an integrated circuit. Drewery teaches that it is advantageous to conductively connect a supplemental plating structure (a bus bar) to a contact that is to be plated

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because the supplemental plating structure can provide better current flow all across the wafer during the plating (col. 7, ln. 2-5; col. 8, ln. 20-24). Nagao discloses that the second contact structure may exist in the form of address line (bus) pads (col. 7, ln. 13-15). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the bus pads (second contact structures) of Nagao as supplemental plating structures for the first contacts because Drewery teaches that by doing so, the plating process is greatly improved by virtue of the fact that the supplemental plating structures allow better plating current distribution over the surface of the wafer.

Regarding claim 2, Nagao discloses that second contact structures are removed after the plating step (col. 11, ln. 21-49).

Regarding claims 3 and 15, Nagao discloses testing the die using the second contact structure as a probe point (col. 11, ln. 18-20).

Regarding claim 6, Nagao discloses disconnecting a conductive connection (21) between the first contact and the second contact structure after the plating operation (col. 11, ln. 21-49).

Regarding claim 8, Nagao discloses that the second contact structure is a sacrificial area which is located at least partly over the die.

Regarding claim 9, Nagao discloses that the conductive connection is located at least partly over the die.

Regarding claims 22 and 23, Nagao discloses a plurality of dice (15), each of which has at least one platable feature (18), and at least one second feature (19) conductively connected to the first platable feature, such that the second feature has a larger surface area than the first platable feature (col. 6, ln. 8-37; col. 11, ln. 11-37). Nagao does not disclose that the second

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feature is platable. Like Nagao, Drewery discloses a process of plating features onto the surface of an integrated circuit. Drewery teaches that it is advantageous to conductively connect a supplemental plating structure (a bus bar) to a contact that is to be plated because the supplemental plating structure can provide better current flow all across the wafer during the plating (col. 7, ln. 2-5; col. 8, ln. 20-24). Nagao discloses that the second feature may exist in the form of address line (bus) pads (col. 7, ln. 13-15). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the bus pads (second feature) of Nagao as supplemental plating structures for the first contacts because Drewery teaches that by doing so, the plating process is greatly improved by virtue of the fact that the supplemental plating structures allow better plating current distribution over the surface of the wafer.

Regarding claim 24, Nagao discloses that the second feature functions as a probe point for testing the dice (col. 11, ln. 18-20).

Regarding claim 26, Nagao discloses that the second feature is a sacrificial feature.

Allowable Subject Matter

Claims 10-14 and 16-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason for the indication of the allowable subject matter of claims 10-14 is the inclusion therein, in combination as currently claimed, of the limitation of plating a supplemental plating structure and a contact in an electroless bath, wherein the supplemental

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plating structure and contact are located on a wafer with a die. This limitation is found in claims 10-14 and is neither disclosed nor taught by the prior art of record, alone or in combination.

The primary reason for the indication of the allowable subject matter of claims 16-21 is the inclusion therein, in combination as currently claimed, of the limitations of fabricating a supplemental plating structure and a contact, using the supplemental plating structure as a probe point for die testing, and plating the contact feature and supplemental plating structure prior to the testing step. These limitations are found in claims 16-21 and are neither disclosed nor taught by the prior art of record, alone or in combination.

Claims 29-34 and 36 are allowed.

The following is an examiner's statement of reasons for allowance:

The primary reasons for the allowance of claims 29-34 and 36 is the inclusion therein, in combination as currently claimed, of the limitations of plating contacts and supplemental plating structures on a wafer having dice in a plating bath of nickel salt, hypophosphite salt, organic acid or chelating agent, and a stabilizer. These limitations were found in claims 29-34 and 36 and are neither disclosed nor taught by the prior art of record, alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

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Nakamura (US 6,841,476) discloses using a supplemental plating structure to electrolessly plate nickel onto a thermoelectric block. Nakamura does not teach or suggest using his plating process on a wafer, die, or integrated circuit.


Gleason (US 6,709,980) discloses electrolessly plating nickel onto a wafer wherein the size of the platable feature determines whether or not the feature will be plated. Gleason does not teach or suggest using a supplemental plating structure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN
February 3, 2005


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